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AUTHOR DeLamarter, William A.; Krepps, Patrice E.
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ABSTRACT

Intrinsic motivation and self-reinforcement can be used identically to explain behavioral persistence in the absence of external reward. Yet the relationship between these concepts has not been adequately explored. Since intrinsic motivation appears to be dependent on an interesting task and self-reinforcement independent of task, it was hypothesized that factorial manipulations of reinforcement (external, self, or none) and task (interesting versus uninteresting) would permit an examination of the relationship between intrinsic motivation and self-reinforcement. Subjects (N=60) rated the interest value of the three tasks while observers recorded the time required to complete the tasks. Results indicated that, for an interesting task, external reinforcement led to the least free-time activity, no reinforcement led to the most, and self-reinforcement yielded intermediate activity. For the uninteresting task, external and self-reinforcement led to greater activity than no reinforcement. Self-reinforcement led to equivalent activity in the interesting and uninteresting task conditions. Findings suggest that arousal is a possible mediator of self-reinforcement and intrinsic motivation effects. (Author)

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Intrinsic Motivation and Self-Reinforcement: The Role of Task Interest

William A. DeLamarter
Allegheny College

Patrice E. Krepps
Avtex Fibers, Inc.

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For copies of the manuscript, please write:

William A. DeLamarter
Department of Psychology, Box 39
Allegheny College
Meadville, PA 16335

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Deci (1971, 1975a) has argued that intrinsic motivation operates when an individual engages in a task without external reward. For example, a volunteer in a hospital or a museum may spend many hours at some activity without any direct compensation or reward. According to Deci's (1975a, 1976) argument, such activities are intrinsically motivating because they increase feelings of competence and self-determination. The volunteer decides whether or not to work. In addition, the volunteer may learn about history in a museum or about medicine in a hospital, increasing feelings of competence.

Initially, Deci (1972, 1976) applied his research to the work environment, arguing that work should be redesigned to allow for more participative management. By allowing workers more input into the decisions which affect their performance, needs for competence and self-determination are fulfilled, resulting in increased productivity and worker satisfaction. More recently, Deci and his associates have applied their research to education (Deci, Nezlek, & Sheinman, Note 2) and to psychotherapy (Ryan & Deci, Note 3).

Nevertheless, the bulk of the research on intrinsic motivation has been directed toward examining the relationship between intrinsic motivation and external reinforcement. Generally researchers ask subjects to work on an interesting task for a reward or for no reward. After the task has been completed, the experimenter leaves the experimental room on some pretext and the subject's behavior is observed. If the subject continues to work on the task, it is assumed that intrinsic motivation is operating. If the subject engages in some alternate activity, it is assumed that the activity is not intrinsically motivating.

Using this paradigm, Deci (1971) obtained the apparently paradoxical finding that payment for performing a task reduced intrinsic motivation whereas verbal praise did not. Later research has demonstrated that external reinforcement reduces intrinsic motivation for college students (Kruglanski, Riter, Arazi, Agassi, Monteqio, Peri, & Peretz, 1975; Zuckerman, Porac, Lathin, Smith, & Deci, 1978) and children (Boggiano & Ruble, 1979; Dollinger & Thelen, 1978; Kruglanski, Riter, Amitai, Margolin, Shabtai, & Zaksh, 1975; Lepper, Greene, & Nisbett, 1973; Ross, 1975). In addition, a number of different tasks have been employed in these studies including finding embedded figures (Boggiano & Ruble, 1979), solving mazes (Dollinger & Thelen, 1978; Kruglanski, Riter, Arazi, Agassi, Monteqio, Peri, & Peretz, 1975), drawing with a magic marker (Lepper, Greene, & Nisbett, 1973), and playing on a drum (Ross, 1975). In Deci's (1971, 1972; Zuckerman, Porac, Lathin, Smith & Deci, 1978) research, the experimental activity was the Soma puzzle composed of seven plastic pieces which can be assembled to form various figures or to form a cube in over a million different ways.

To explain why external reinforcement reduces intrinsic motivation, researchers (e.g. Greene, Sternberg, & Lepper, 1978; Lepper, Greene, & Nisbett, 1973) have proposed the overjustification hypothesis based on Bem's (1972) Self Perception Theory. According to the hypothesis, people make attributions to explain their behavior. If a reward is present, one is likely to attribute performance to the reward and devalue the interest value of the activity. If, however, there is no reward present, the individual attributes the behavior to interest in the activity. In this situation, the individual is likely to continue the behavior if given the opportunity to do so.

Although the overjustification hypothesis has usually been invoked to explain the detrimental effects of reward on intrinsic motivation, it is not the explanation preferred by Deci (1972). He has argued that cognitive reevaluation of the task occurs as a function of the introduction of the reward. An activity which gives rise to feelings of self-satisfaction leads one to feel that the locus of causality for the behavior is internal. When an external reward is introduced, the locus of causality for the behavior shifts from the person to the reward. Thus, the behavior is reevaluated resulting in reduced interest in the activity and lowered intrinsic motivation.

Cognitive reevaluation theory implies that rewards will not lower intrinsic motivation if the locus of causality is not shifted from the individual. For example, Deci (1972) found that noncontingent rewards do not lower intrinsic motivation presumably because a noncontingent reward does not lead one to feel that the reward is the reason for the behavior. Similarly, Deci (1971) found that verbal praise did not reduce intrinsic motivation. Praise from someone may not be distinguishable from the feelings of self-satisfaction one has for doing a job well. Thus, the locus of causality for the behavior remains within the person when verbal praise is used.

Although cognitive reevaluation theory appears similar to the overjustification hypothesis and they make some of the same predictions, there are important differences. First, cognitive reevaluation theory assumes that there are innate feelings of self-satisfaction which are elicited by some activities. Overjustification does not assume innate needs and implies that environmental discriminations are made with the result that the behavior is attributed to the self or to the environment.

Second, overjustification implies that all external rewards should lead one to attribute control of the behavior to the reward. Research has noted several exceptions or qualifications to this, including: whether or not the rewards are intrinsic to the task (Kruglanski, Riter, Arazi, Agassi, Monteqio, Peri, & Peretz, 1975), type of reward used (Dollinger & Thelen, 1978), whether or not a standard for performance exists (Boggiano & Ruble, 1979), and salience of the reward (Ross, 1975). Nevertheless, the overjustification hypothesis states any external reward may lead to an environmental attribution. On the other hand, cognitive reevaluation theory assumes that rewards which do not interfere with innate feelings of self-satisfaction or which do not thwart needs for competence and self-determination will not reduce intrinsic motivation.

Furthermore, Deci (Note 1, 1975a,b) has argued that the impact of rewards on intrinsic motivation will depend on whether the reward is informational or controlling. A reward is controlling when an individual engages in a task for a specific reward. For example, an employee is hired to perform some task for a specified compensation. Piecework is the most extreme example of a controlling reward since payment is contingent on the amount of production and it is expected. Rewards are informational when they serve to indicate that a performance was appropriate, useful, or praiseworthy. Praising someone for a job may inform the recipient that a specific behavior was well done, increasing feelings of competence. Soliciting workers' opinions of how to do their jobs more efficiently may inform them that they have a contribution to make to the work environment and may thus increase their feelings of self-determination and competence.

Most of the research to date has centered on examining intrinsic motivation and the various parameters of contingent, tangible, external

rewards. Unfortunately, other rewards have not been adequately explored although Deci (1971) suggested rather early that not all rewards operate similarly.

The social learning literature does contain a great deal of research on a variety of rewards including self-reinforcement which appears similar to intrinsic motivation. Self-reinforcement (Bandura, 1977, pg. 130) has been used to explain situations in which individuals engage in an activity without visible external rewards. According to the theory, self-reinforcement is a motivational process whereby individuals reward themselves when they have reached a standard imposed by an outside agent or acquired through modeling (e.g. Bandura & Perloff, 1967; Marston, 1965; Mischel & Liebert, 1966). As Bandura (1977, pp. 131-133) has noted, there are few activities in an individualistic, competitive society for which objective standards of performance exist. Therefore, the standards for self-reinforcement usually involve comparison of one's behavior with that of others. If a person's behavior is better than that of the comparison other, self-satisfaction results and self-reward is administered.

Since self-reinforcement and intrinsic motivation are both invoked to explain behavioral persistence in the absence of reward and since both are considered motivational, it might be argued that the concepts are identical. However, the underlying assumptions, or metatheory, or the two concepts are quite different. Intrinsic motivation (Deci, 1975a, Zuckerman, Porac, Lathin, Smith, & Deci, 1978) posits innate needs for competence and self-determination. Thus, it rests on humanistic assumptions of human behavior. Self-reinforcement, on the other hand, is firmly within the learning, behavioral psychology tradition which rejects innate needs as

motivators of behavior. Thus, self-reinforcement researchers generally examine the impact of environmental variables such as prior learning, discrimination, and generalization (Kanfer & Marston, 1963); type of task and type of reinforcement (Marston, 1964); and external reinforcement (Marston & Kanfer, 1963) on the use of self-reinforcement.

In spite of the metatheoretical differences, one might argue that self-reinforcement would not lower intrinsic motivation since by its very name it is self-generated and self-determination is essential for intrinsic motivation (Zuckerman, Porac, Lathin, Smith & Deci, 1978). However, the only published attempt to relate self-reward to intrinsic motivation demonstrated that self-reward and external reward reduced intrinsic motivation equally (Dollinger & Thelen, 1978). There are a number of reasons why the self-reward manipulation in the Dollinger and Thelen (1978) research is problematical. First, the subjects were children who may not have fully understood the meaning of self-reinforcement or the standards used to administer it. Second, the self-reinforcement consisted of awarding oneself "good player awards" when successfully completing a maze. Since the children had to establish their own definition of success on the task, they may have found self-reward difficult if not frustrating. Third, as Dollinger and Thelen (1978) note, subjects were not given a choice to reward or not; they were instructed to use self-reward. Thus, self-determination in the use of reward was absent. In sum, the problems with this particular study make it difficult to determine the relationship between self-reinforcement and intrinsic motivation.

If one examines self-reinforcement carefully, it is apparent that self-reinforcement contains both a controlling and an informational

component. Control is manifested when self-reinforcement is used to maintain a behavior (Bandura, 1977, pg. 130). In fact, Marston and Kanfer (1963) found that self-reinforcement did not increase the level of acquisition of a response, but it did maintain a response at a previously learned level. Moreover, self-reinforcement in the literature is imposed by the experimenter who instructs the subject on its use (e.g. Dollinger & Thelen, 1978; Marston, 1964; Marston & Kanfer, 1963). Thus, there is some element of coercion to use self-reinforcement in this research.

However, self-reinforcement is also informational. First, it is self-determined. Theoretically, the user decides when to use self-reinforcement, and even in the research, the user decides how much self-reinforcement to administer. Second, it provides information to the user that the performance has been praiseworthy even if external verification is not forthcoming. In sum, there are elements in self-reinforcement which should increase as well as reduce intrinsic motivation in a task.

A final difference between self-reinforcement and intrinsic motivation lies in the nature of the task used in the research. Although there is nothing in the theory which indicates that intrinsic motivation is stimulated by an interesting task, the research generally employs one. As mentioned earlier, Deci (e.g. 1971, 1972; Zuckerman, Porac, Lathin, Smith, & Deci, 1978) used the Soma puzzle which is advertised as a brain teaser. Dollinger and Thelen (1978) had children working on mazes and copying geometric designs. In these studies there is the assumption that the task was interesting to the subject populations involved. Moreover, Kruglanski, Riter, Arazi, Agassi, Monteqio, Peri, & Peretz (1975) found that intrinsic motivation was very dependent on task interest.

Self-reinforcement, on the other hand, is not dependent on task interest. Since the individual decides whether or not to administer the reward, it can be administered for either an interesting or an uninteresting task. Some of the tasks, such as the bowling game used by Mischel and Liebert (1966) or the crank turning game used by Bandura and Perloff (1967), may have been interesting to the children who were subjects. However, the tasks used in other self-reinforcement studies may not have been so interesting. For example, Marston and Kanfer (1963) had subjects rewarding themselves with a light for discovering a critical class of words. While no data were collected on the interest of the tasks used in the self-reinforcement research, an examination of the literature suggests that task interest has differential effects for self-reinforcement and intrinsic motivation.

Thus, in an attempt to relate intrinsic motivation to social learning theory and to examine the role of task interest, the present study manipulated type of reinforcement and task interest factorially. It was predicted that there would be an interaction between type of reinforcement and task interest. For the interesting task, both cognitive reevaluation and the overjustification hypothesis predict that no reward will lead to more intrinsic motivation than external reward. If self-reinforcement is controlling and informational, self-reinforcement should yield levels of intrinsic motivation between that of no and external reward. For the uninteresting task, the controlling aspects of external and self-reinforcement should result in greater activity than no reward. Finally, if self-reinforcement is independent of task, levels of performance and amount of self-reinforcement should be similar in the interesting and uninteresting task conditions.

Method

Subjects

Sixty-two students who were enrolled in introductory psychology classes served as subjects and received extra course credit for experimental participation. Data from two subjects were discarded due to a procedural error. The remaining sixty subjects were randomly assigned to experimental conditions, yielding ten subjects per cell.

Design

A 2 x 3 factorial design manipulating task (interesting versus uninteresting) and reward (external, self, and none) was used.

Independent Variables

Task Interest. As in previous research (e.g. Deci, 1971), the Soma puzzle was used as the interesting task. A comparable, uninteresting task was determined through pilot testing. In the uninteresting task conditions, subjects were asked to form a number of configurations using one inch wooden blocks.

Reward. In the external reinforcement conditions, subjects were told that successful completion of two of the three experimental tasks would earn a ticket to a campus movie. In the self-reinforcement conditions the concept was explained and subjects were told to select from one to 100 poker chips to reward themselves for their behavior. In the no reinforcement condition, subjects were asked to perform the tasks without any mention of reward.

Procedure

Each subject was greeted by the experimenter and was escorted to an experimental room containing a table and two chairs. On the table was either a Soma puzzle (high task interest) or wooden blocks (low task interest),

two magazines (Newsweek and The New Yorker) and a stack of white cards. On the cards were drawn the figures which could be completed with the task pieces. For subjects in the self-reinforcement conditions there was also a box of poker chips. A one-way mirror was covered with cloth to reduce subject suspicion.

Subjects were informed that they were participating in a pre-test to determine the interest value of three tasks which would be used in a subsequent problem-solving experiment. Before beginning the experiment, the reinforcement manipulation was introduced. Subjects in the external-reinforcement conditions were told that they could earn a ticket to a campus movie by correctly solving two of the three tasks. In the self-reinforcement conditions, self-reinforcement was explained and subjects were told to reward themselves with the number of poker chips they felt their performance deserved. In the no-reinforcement conditions, subjects were simply handed the instructions for the first task.

Each subject was given ten minutes to complete each of the three tasks. If a subject did not finish the task within the time limit, the experimenter demonstrated the correct solution and the subject moved to the next task. Following the third task, each subject was asked to complete two questionnaires.

The first questionnaire asked subjects to rate the interest value of each of the tasks. When the subject finished, the experimenter reached for the second questionnaire only to discover that she did not have any copies. Flustered, she explained to the subject that she would have to leave the room and make more copies. The subject was asked to remain in the room until the experimenter returned. Before leaving she told the subject to read one of the magazines or work with the task pieces as the subject wished. She then pointed out a number of other figures which could

be constructed and which she stated were being used by other subjects. The experimenter said "Do whatever you want; I'll be back soon." and then left the room for eight minutes.

During this free-time period, the subject's behavior was covertly observed by a confederate through the one-way mirror. The confederate recorded the amount of time, in seconds, the subject spent working with the task pieces.

When the experimenter re-entered the room, she apologized again for the delay and administered the second questionnaire. After completing this questionnaire, the subject was fully debriefed, thanked, and dismissed. Each subject, regardless of experimental condition, was given a free movie ticket.

Results

Intrinsic Motivation Measures

Since the free-time data were not normally distributed, a log + 1 transformation was used to convert these data to conform to the assumptions of the analysis of variance.

Table 1 presents a summary of the analysis of variance for time spent working with the task pieces during free time.

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Insert Table 1 about here

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The interaction between task interest and reinforcement, $F(2,54) = 5.27$, $p < .05$, indicated that the time spent on the task during free time was greatest in the no-reinforcement ($M = 2.34$), intermediate in the self-reinforcement ($M = 1.88$), and least in the external-reinforcement ($M = 1.47$) conditions for the interesting task. For the uninteresting task, the

Table 1

Analysis of Variance for Log Transformations of Free-Time Data

Source of Variance	df	MS	F
A (task interest)	1	1.16	1.68
B (type of reinforcement)	2	.32	.46
AB	2	3.63	5.27*
S/AB	54	.69	

*$p < .05$

external ($\underline{M}$ = 1-64) and self-reinforcement ($\underline{M}$ = 1.92) conditions yielded the greatest task activity while the no-reinforcement condition ($\underline{M}$ = 1.10) produced the least. This interaction is illustrated in Figure 1.

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Insert Figure 1 about here

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A log + 1 transformation was also used to convert subject's estimates of the amount of time they spent working on the task. The results yielded a main effect of task interest, $\underline{F}$ (1, 54) = 9.52, $p < .01$. Self-reinforcement condition subjects in the interesting-task conditions ($\underline{M}$ = 1.71) felt that they had spent more time working with the task pieces during free time than subjects in the uninteresting-task conditions ($\underline{M}$ = .80).

Self-Reinforcement

Subjects in the self-reinforcement conditions selected as many poker chips for performing the interesting task ($\underline{M}$ = 9.7) as for the uninteresting one ($\underline{M}$ = 7.6), $\underline{t}$ (18) = .69, $p > .05$. Moreover, a comparison of the amount of time spent working with the task pieces during free time for the self-reinforcement conditions failed to yield significant differences for task interest using a Tukey test, $\underline{Q}$ (2,54) = .152, $p > .05$. Subjects in the interesting-task conditions spent slightly less time working with the pieces during free time ($\underline{M}$ = 1.88) than those in the uninteresting-task condition ($\underline{M}$ = 1.92).

Questionnaire Data

Seven point Likert-type questions were used to assess subject reactions to the experiment and to check on the effectiveness of the experimental manipulations.

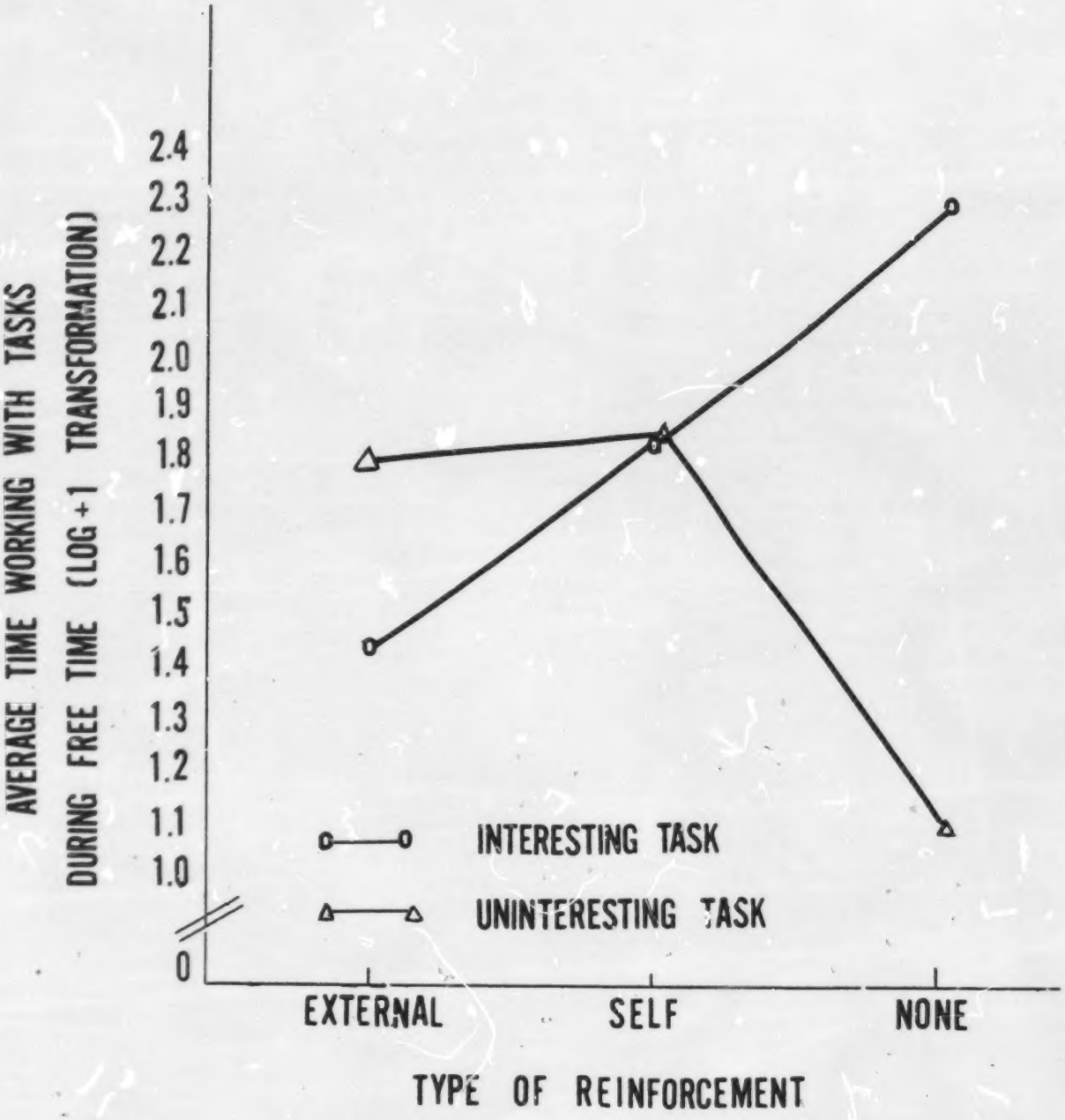

Figure 1. Interaction between task interest and type of reinforcement data.

Analysis of the subject ratings of the three experimental tasks yielded main effects of task interest for tasks 1 and 3, F (1.54) = 32.31, $p < .05$ and F (1, 54) = 13.47, $p < .05$. Thus, the task interest manipulation was successful since subjects in the interesting-task conditions (Task 1, M = 2.77; Task 3, M = 2.37) rated these tasks as more interesting than the uninteresting tasks (Task 1, M = 4.67; Task 3, M = 3.80).

A question asking how difficult it was to construct the figures with the task pieces yielded a main effect of task interest, F (1, 54) = 176.41, $p < .05$, indicating that the Soma puzzle was more difficult (M = 4.37) than the wooden blocks (M = 1.13). In addition, a question asking subjects how diligently they worked with the task pieces during the free-time period yielded a main effect of task interest, F (1,54) = 6.83, $p < .05$, with subjects in the interesting-task conditions feeling they worked harder (M = 4.83) during the free-time period than those in the uninteresting-task conditions (M = 6.13).

Discussion

This study clearly supports previous findings (e.g. Deci, 1971; Dollinger & Thelen, 1978; Lepper, Greene, & Nisbett, 1973) that external contingent reinforcement does reduce subsequent task interest. Moreover, it was found that intrinsic motivation as measured by free-time activity is dependent on task interest. Finally, self-reinforcement appears to be independent of task interest.

Unfortunately, the questionnaire responses do not allow one to distinguish between the cognitive reevaluation (Deci, 1972) and the overjustification (Lepper, Greene, & Nisbett, 1973) explanations of the effects of reward on intrinsic motivation. In this study, subjects felt that they were reacting solely to task interest as indicated by their

estimates of the amount of time spent on the task during free time and various questionnaire responses. However, the behavioral measures indicate that subject behavior was a joint function of reward and task. It was expected that subjects in the intrinsic motivation conditions would express a desire to work with the task pieces after the experiment was concluded and would indicate some motivation to work with the task pieces during the free-time period. However, there were no differences among experimental conditions on these measures.

A number of explanations for the failure to obtain the expected questionnaire responses are possible. First, these questions may not have been appropriate for the study. This explanation is not likely since the questions were suggested by the theory and were similar to those used in previous research. A second, and more plausible explanation, is that the task interest manipulation overshadowed the impact of the reward conditions. The success of this manipulation is evidenced by subject ratings of the experimental tasks. A third possibility is raised by the findings that the Soma puzzle was more difficult and that subjects worked harder on it than the wooden blocks. The difficulty of the task may have introduced some frustration into the situation so that subjects were willing to quit when the experimenter returned. Perhaps it was for this reason that subjects indicated on the questionnaire little desire to continue working with the task at a later date.

If the Soma puzzle led to some feelings of frustration, questions about what constitutes an interesting task are raised. Although the Soma puzzle was rated as interesting, the reasons why it was interesting are unclear. Its initial appearance and "rules" are not complex. Perhaps tasks which we label as interesting are those perceived as challenging

after attempting them. The Soma puzzle fits this description quite well. Since the pieces may be formed into a cube in over a million ways, one's first reaction is that the task is easy. However, brief experience with the puzzle indicates that forming a simple cube is very difficult for most.

If one has difficulty during the task phase of the experiment and observes the experimenter easily constructing the cube, then the subject may be even more highly motivated to succeed. Nevertheless, the task is still difficult, and difficulty may soon turn to frustration. Frustration, even if the subject is eventually successful, may thwart the competency needs (Deci, 1975a,b) essential to intrinsic motivation. In future research it may be useful to lengthen the free-time period or use a persistence measure along with a frustration measure to determine if the puzzle ceases to be interesting and begins to be frustrating.

Another element of task interest which may be explored is novelty. Novelty, according to some theorists, (e.g. Berlyne, 1967) alters the arousal level of the individual. Change in arousal to an optimal level is reinforcing. If the novelty of the Soma puzzle generated and reinforced activity during free time, then one would expect a decline in activity as the subjects became more familiar with the task. In that case, lengthening the free-time period may lead to satiation and a decline in subject activity. The novelty, and possible arousal-generating capabilities, of interesting tasks should be more fully explored.

If one makes some assumptions, arousal may explain the pattern of results obtained in the present study. First, one must assume that the Soma puzzle was arousing whereas the wooden blocks were not. Second, one must assume that reinforcement served as a signal to terminate behavior.

The second assumption is reasonable since reinforcement is generally administered at the end of a task. Given these assumptions, one could argue that subjects who were not rewarded continued to work on the Soma puzzle during free time because the task was still novel and therefore arousing. Subjects who were rewarded for working on the Soma puzzle, however, did not work on the puzzle during free time because the receipt of the movie ticket indicated that the experiment was over. For the uninteresting task, arousal was not generated. Therefore, reward, either external or self, was necessary to stimulate behavior.

Although there are clearly problems with an arousal explanation, including why subjects continued to work with the wooden blocks after they had been rewarded, the presence of arousal in intrinsic motivation studies should be examined. If there is validity to the hypothesis, it would tie the research on intrinsic motivation to social learning theory and general arousal theory. Unfortunately, the present research was not designed to test this proposition. Therefore, the arousal argument is only suggestive.

The present study makes two important contributions to the literature on intrinsic motivation. First, it demonstrates that intrinsic motivation is stimulated by an interesting task. Second, and more importantly, it suggests that intrinsic motivation and self-reinforcement are separate phenomena which operate most efficaciously in different situations.

The second contribution is particularly important since Bandura (1977, pp. 107-115) has been highly critical of the concept of intrinsic motivation. First, Bandura has argued that intrinsic motivation is circular since it is inferred from the behavior which caused it. Second, Bandura argues that self-reinforcement explains the same behavior without invoking untestable assumptions about innate needs for competence and self-determination.

Unfortunately, self-reinforcement also is liable to the first criticism. In the usual experiment, subjects are instructed to use self-reinforcements such as the word "good" (Marston, 1965), a light (Kanfer & Marston, 1963; Marston, 1964), or poker chips which could be exchanged for prizes (Bandura & Perloff, 1967; Marston & Kanfer, 1963; Mischel & Liebert, 1966). Since subjects are capable of following the experimenter's directions about the use of self reward, the effects of self-reinforcement on behavior have been demonstrated. However, these demonstrations do not provide any evidence, other than anecdotal, that subjects use self-reinforcement strategies outside the laboratory.

As for Bandura's (1977) second criticism, the present findings suggest that self-reinforcement and intrinsic motivation may not be the same phenomena. Deci (Note 1) has argued that traditional reinforcement concepts can be used effectively to control behavior, but he argued that intrinsic motivation, if it can be stimulated, may be even more effective than reinforcement. The results of this study support that argument. In those situations where the task is interesting or can be made interesting, reinforcement systems, either externally or self-generated, may not be the most effective techniques. However, since intrinsic motivation appears to be dependent on task interest, in those situations where the interest value of the task is low or unclear, self-reinforcement systems may be the most efficacious.

It is interesting to note that self-reinforcement reduced intrinsic motivation as much as external reinforcement in the Dollinger & Thelen (1978) study whereas in the present study it did not. Perhaps, as Dollinger and Thelen (1978) suggest, their research did not provide an adequate test of self-reinforcement since the children were not given a

choice of whether or not to use it. Perhaps self-determination in the use of self-reinforcement increased intrinsic motivation in the interesting task because self-determination makes the reward informational rather than controlling. Regardless, in this study, as well as in the previously mentioned self-reinforcement research, a self-reinforcement strategy was imposed on the subjects. The best test of the relationship between intrinsic motivation and self-reinforcement may be to teach a self-reinforcement strategy to subjects and then, in another context, test those subjects in an intrinsic motivation situation.

Since the effect of self-reinforcement for the interesting task was between that of the external reward and no reward conditions, it may be assumed that self-reinforcement suggested by the experimenter possesses both controlling and informational aspects. To assume that both operated is consistent with the data for the interesting task conditions. The control may be inherent in self-reinforcement or it may be in the experimental imposition of the strategy. The informational component may rest within the individual's decision to use or not to use the strategy, as suggested earlier, or it may rest in the decision about how much self-reinforcement to administer. Alternatively, the informational component may rest in the subject's personal acknowledgment that they have done something deserving of reward. While the present data do not allow one to select among the various alternatives, it is clear that future research should examine the informational and control components of reward.

In sum, intrinsic motivation appears to be dependent on task interest whereas self-reinforcement does not. As Hamner & Organ (1978) note, where work can be redesigned to make it more meaningful for the worker, intrinsic motivation, with concomitant effects on productivity and satisfaction, may

be increased. However, the findings of this research might add that in those situations where work cannot be altered or where there is great variability in individual reactions to the activity, self-reinforcement strategies may be a viable option.

[1]*This study was based on an undergraduate senior comprehensive conducted by the second author under the direction of the first. The authors would like to thank Ms. Sharon Miller and Ms. Mollie McKibben for serving as observers.*

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